

I CLAIM:

1) A device for monitoring the integrity of the thermal protection tile system on a space craft, comprising:

at least one pair of electrical conductors extending along, and in contact with, multiple tiles of the thermal protection tile system,

multiple resistors of known resistance extending between each of said at least one pair of electrical conductors, each one of said multiple resistors in contact with one of said multiple tiles,

resistance measuring means connected to at least one end of said at least one pair of electrical conductors,

computing means incorporating said resistance measuring means, and providing a real time output indicative of the integrity of said thermal protection tile system, and

display means for providing a visual indication of the output of said computing means,

wherein said computing means continually monitors the resistance in said at least one pair of electrical conductors in real time, and provides a visual indication at said display means of a significant resistance change, indicating a loss of integrity of said thermal protection tile system.

2) The device for monitoring the integrity of the thermal protection tile system on a space craft of claim 1, wherein said at least one pair of electrical conductors is embedded within said tiles.

3) The device for monitoring the integrity of the thermal protection tile system on a space craft of claim 1, wherein said at least one pair of electrical conductors is adhered to a thermally protected side of the tile.

4) The device for monitoring the integrity of the thermal protection tile system on a space craft of claim 1, wherein said resistance measuring means is connected to both ends of said at least one pair of electrical conductors thereby providing an indication of both location and extent of loss of tile integrity.

5) A method of monitoring the integrity of the thermal protection tile system on a spacecraft comprising the steps of:

providing at least one pair of electrical conductors extending along, and in contact with, multiple tiles of the thermal protection tile system,

providing multiple resistors of known resistance extending between each of said at least one pair of electrical conductors, each one of said multiple resistors in contact with one of said multiple tiles,

providing resistance measuring means connected to at least one end of said at least one pair of electrical conductors,

providing computing means incorporating said resistance measuring means, said computing means providing an output indicative of the integrity of said thermal protection tile system,

providing display means for providing a visual indication of the output of said computing means,

continually measuring the resistance in said at least one pair of electrical conductors and comparing the measured resistance to a baseline resistance value, wherein a substantial difference between said measured resistance and said baseline resistance value is indicative of a loss of integrity in said thermal tile protection system, and,

providing an output to said display means indicative of said loss of integrity in said thermal tile protection system.

6) The method of monitoring the integrity of the thermal protection tile system on a spacecraft of claim 5 further comprising :

determining the actual magnitude of the difference between said measured resistance and said baseline resistance value,

providing an output to said display means indicative of the location of said loss of integrity, based on the determined actual magnitude of the difference between said measured resistance and said baseline resistance value.

7) The method of monitoring the integrity of the thermal protection tile system on a spacecraft of claim 5 further comprising:

connecting said resistance measuring means to two ends of said at least one pair of electrical conductors,

continually measuring the resistance in said at least one pair of electrical conductors alternately at each of said two ends and comparing the measured resistance to a baseline resistance value,

providing an output to said display means indicative of the location and extent of said loss of integrity, based on the determined actual magnitude of the difference between said measured resistance and said baseline resistance value at each of the two ends of said at least one pair of electrical conductors.